5. Quantify Mission Deficiencies

This chapter describes how the Partnership Process uses input from the warfighter, such as Air Tasking Orders (ATOs) and mission plans, to identify and quantify the deficiencies that are stated in the Mission Needs Statement (MNS). This chapter also lays the groundwork for using the Partnership's Military Worth Method throughout the rest of the acquisition cycle. Furthermore, the breakthrough concepts introduced in this chapter will continue to play an important role.

The activities in this chapter correlate with the DoD 5000 phase, Determination of Mission Need, that occurs before Milestone 0.

In particular, this chapter covers the following topics:

- Understanding the new process
- Understanding the key insights and redesign ideas
- The step-by-step process

5.1 Understanding the New Process

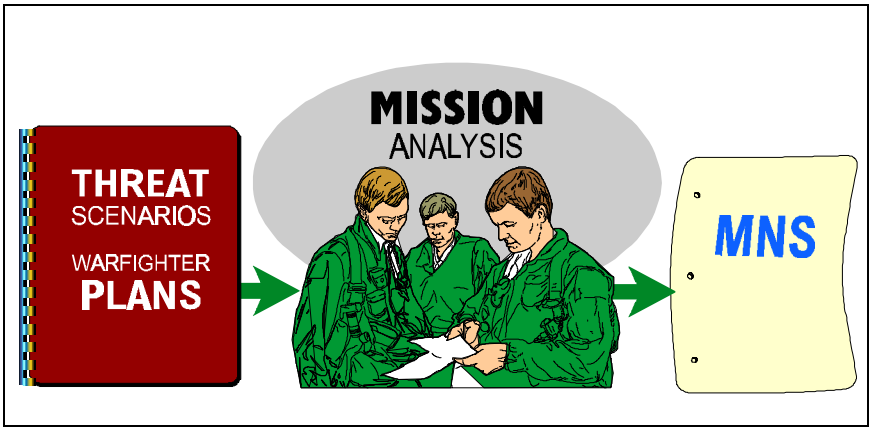


Figure 5-1. Quantifying Mission Deficiencies Process Flow. *In this chapter, we use threat scenarios and warfighter input, such as air tasking orders and mission plans, to identify and quantify the deficiencies that will be documented in the MNS.*

In this chapter, we engage in the pre–Milestone 0 activity of determining the mission needs. The results of this analysis are summarized in a MNS. In the following five activity chapters, we will see how the Partnership Process helps us achieve greater success in establishing requirements, conveying requirements, selecting the source, developing the solution, and evaluating the result.

One of the resolutions of the Partnership Process is that every decision we make in an electronic warfare (EW) acquisition should resonate with the voice of the warfighter. For this reason, it is crucial to identify and quantify the warfighter's needs at the very beginning of the acquisition.

Under the Partnership, the two most significant changes in this stage of the acquisition are that the warfighter is directly involved in identifying deficiencies and that deficiencies can be quantified.

Involve the Warfighter in Identifying Deficiencies

By using actual war plans to identify deficiencies, we ensure that we're focusing on real, not perceived, problems.

One tenet of the Partnership Process is that the voice of the warfighter must be heard throughout the acquisition process. The warfighter's objectives are driven by Defense Planning Guidance from the National Command Authorities. For this reason, the Partnership begins the process of identifying deficiencies by using both warfighting plans and threat scenarios that are developed in response to the Defense Planning Guidance.

The Defense Intelligence Agency (DIA) develops standard threat scenarios based on the Defense Planning Guidance. These threat scenarios serve as the basis against which all deficiencies are identified. By using standard threat scenarios, we ensure that threat scenarios are not biased to support one program over another.

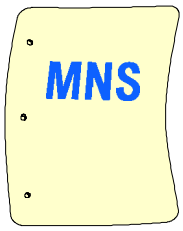
Use Modeling to Quantify Deficiencies

The "geometric" benefits of an EW system allow the warfighter to reach coordinates that are otherwise not accessible.

Once we have complete information on a threat scenario and the warfighter's battle plan, we can use modeling programs such as ESAMS and SUPPRESSOR to determine the outcome of each mission. Since EW systems provide geometric benefits to the warfighter, we can calculate how effective an EW system must be to allow the warfighter to avoid threats and reach targets successfully.

The information obtained from modeling allows us to construct a "deficiency trade space" that shows how different levels of deficiency relate to varying abilities to accomplish ATO tasks—for example, putting targets at risk. A highly deficient EW system would have a low ability to put targets at risk. Later in the process, this trade space will allow us to make tradeoffs between the performance, cost, schedule, and risk of potential solutions.

State the Quantified Deficiency in the MNS



The output of the modeling and simulation conducted in this stage is the MNS with a quantified deficiency stated at the campaign level.

In the past, the MNS stated the deficiency at the engagement, or threat, level. The MNS described the system capability needed to respond to a new threat capability. This type of deficiency limited the space of possible solutions, because a solution could answer only the threat-specific deficiency in the MNS.

Today, the deficiency is stated at the campaign level; for example, "Percent of targets held at risk versus threat X is unacceptable." By stating the deficiency at a higher level, we leave room for a wide range of solutions. Furthermore, the deficiency is stated in terms of value to the warfighter.

Involve Industry Early in the Acquisition

For more information on the Integrated Concept Team, see Section 5.2.3.

Another tenet of the Partnership Process is that early and continuous partnering of all functional elements is critical. In particular, industry must be involved from the very beginning—the stage when the warfighter identifies deficiencies—so that it can understand our problem and help us find the best solution.

One vehicle for industry involvement is the Integrated Concept Team (ICT). This interdisciplinary team is composed of experts from both industry and government, such as major command (MAJCOM) requirements staffs, program management, test and evaluation agencies, contractors, and laboratories. The ICT is formed as soon as a deficiency is identified and works together until a solution to the deficiency is developed. By involving all of the "stovepipes" in the ICT, we ensure a continuous dialog between government and industry from the beginning to the end of the acquisition.

For more information on the consolidated threat library, see Section 5.2.7.

A second vehicle for industry involvement at this stage of the acquisition is the consolidated threat library. This library includes information on both threat characteristics and threat vulnerabilities and provides a mechanism to disseminate threat information to industry in one package. The library doesn't need to have all the threat data in one location, but industry and government should be able to clearly see where the data actually resides. Further, all information should be available through a single gateway. With the consolidated threat library available to them, industry can better understand the specific vulnerabilities of many individual threats and can come up with means to defeat them.

Accredit the Requirements Development Field

Requirements development is as much a part of acquisition as research, systems engineering, program management, contracting, and testing and evaluation. For this reason, we suggest developing ways to accredit the field of requirements development.

For more information on accrediting the requirements development field, see Section 5.2.8.

First, we suggest creating position descriptions and formal requirements training. Second, we could increase the ratio of acquirers to operators on MAJCOM requirements staffs. These breakthrough ideas would ensure that requirements development personnel are:

- Trained in the critical aspects of the acquisition process.
- Attracted to the field because it has recognized legitimacy and because it values the expertise they bring.
- Included on MAJCOM requirements staffs where they can be involved in the early program decisions that have a tremendous effect on a system's life cycle.

Evolve Modeling Tools to an Object-Oriented Framework

Existing modeling and simulation tools (ESAMS, SUPPRESSOR, and THUNDER) are legacy models implemented in older programming languages that are rapidly being superseded. The Partnership recognizes that we will gain significant benefits by moving to new models developed with "object-oriented" software technologies. Several programs such as JMASS, JWARS, and JSIMS are already in place or are in the planning stages to support a high-level architecture (HLA) that would realize this vision.

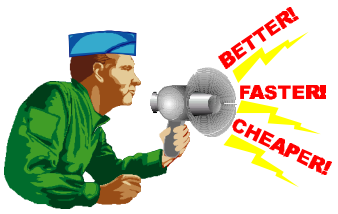
Some of the benefits of this evolution are reusability of algorithms, the ability to attain interoperability of models, and greater ease in modifying models to meet new requirements.

5.2 Understanding the Key Insights and Redesign Ideas

Key Insights and Redesign Ideas

- Involve the warfighter in identifying deficiencies.
- Increase industry involvement.
- Create an Integrated Acquisition Team (IAT).
- Perform geometrically based mission effectiveness/mission assessment.
- Introduce the Military Worth Method into acquisitions.
- Use standard threat scenarios.
- Create a consolidated library of information on threat systems.
- Accredit the requirements development field.
- Apply funds for concept exploration on approval of the MNS.

5.2.1 Involve the Warfighter in Identifying Deficiencies



One tenet of the Partnership Process is that we must respond to the warfighter's needs at every stage of our process. During the stage of identifying deficiencies, this means relying on the warfighter to determine the real problem.

Listening to the Voice of the Warfighter

In the past, the people who conducted mission effectiveness analyses were responsible for projecting the manner in which the warfighters would employ their forces. These projections were then used as inputs to models and simulations. The people making such projections may or may not have had extensive operational experience with the weapons systems they were analyzing, but if they did have related operational experience, it was frequently somewhat dated.

Today, we go to the warfighting Commander in Chief, the battle staff, and the operational aircrews to get the actual Operations Plans, Air Tasking Orders, and flight profiles. Instead of staff officers speaking for the warfighter, warfighters speak with their own voices.

*By performing modeling and simulation on the mission plans developed by the warfighter, we can determine our capabilities against projected threats more accurately and more **realistically**.*

By performing modeling and simulation on the mission plans developed by the warfighter, we can determine our capabilities against projected threats more accurately and more *realistically*. For example, if the warfighter uses tactics that negate the lethality of a certain threat, then no materiel EW solution is required for that threat. Likewise, we may find that the preferred tactics drive us to solutions that may not have been considered in the past because the developer had no insight into how the weapon system was being employed.

Involving the warfighter in mission deficiency identification in this manner not only gives the process much greater credibility, but allows us to ensure that our analysis focuses on deficiencies that are important to the warfighter.

Using a Requirements Pull to Drive Acquisitions

Historically, EW systems have been justified and developed based on either a product push or a technology push. Under the Partnership, EW systems are developed primarily on a requirements pull.

Product push. In the past, the Operational Requirements Document (ORD) was sometimes written with a specific solution in mind—sometimes even an EW product that had already been developed. Currently, there are ORDs that contain "requirements" for specific solutions.

Technology push. When the capability of EW systems was measured in increased survivability, any system that promised greater survivability was perceived as necessary and worth any cost. As a result, decision makers felt obliged to pursue any technological development regardless of cost or schedule, and so the leading edge of EW technology pushed the need for acquisitions.

Requirements pull. A fundamental outcome of the Partnership is to restructure the EW acquisition process around the voice of the warfighter and the warfighter's deficiency, not around improvements in technology or predetermined solutions. The voice of the warfighter is heard loudest in the initial phase of the process, but as we develop a solution, we have the means to constantly validate that the final outcome will meet the warfighter's requirements.

For more information on the potential solutions trade space, see Section 6.3.6.

This is not to suggest that new technologies have no part in the Partnership Process. The difference is that a technology push does not come into play until after the warfighter has identified the deficiency. At that point, technology information can add potential concepts to the trade space of solutions that could address the

deficiency. The feasibility of the technologies proposed by industry helps shape this trade space.

In fact, with the Partnership Process, we have the best of both worlds. Since government and industry are sharing information at the beginning of the process, industry can showcase its innovative technologies and their military worth. At the same time, the warfighter is participating in the dialog and can decide if the technology has the potential to meet warfighter needs.

5.2.2 Increase Industry Involvement

Another tenet of the Partnership Process is that early and continuous partnering of all functional elements is critical. In particular, industry must be involved from the very beginning—the stage when the warfighter identifies deficiencies—so that it can understand our problem and help us find the best solution.

In the past, industry was involved in EW acquisitions in a reactive mode, not an active mode. Government identified the deficiency, decided on a solution, and finalized the solution in terms of exact specifications in a Request for Proposal (RFP). Industry became involved at the RFP stage and could develop only the solution that the government ordered. In some programs, industry never saw the ORD, even after the contract was awarded.

Today, government communicates its problem to industry and industry is encouraged to exercise one of its core competencies—coming up with creative, innovative solutions.

Today, industry is encouraged to exercise one of its core competencies—coming up with creative, innovative solutions.

The benefits of increased industry involvement in the early stages of an acquisition are:

- Industry is fully aware of the warfighter's problem, so it can help develop the most effective solution.
- Industry knows where to allocate its independent research and development (IR&D) funds.
- The government gains access to industry's cutting edge technologies.

Increasing Government Awareness of Industry R&D

The Partnership endorses the following activities to increase government's awareness of industry research and development (R&D):

- Technologists visit the field.

- Conferences on R&D projects are held to keep the user informed about what is possible (or nearly possible).
- Resources are optimized for feasibility studies, prototype experiments, and operational assessments.

Allowing Industry to Work Independently of Government

During the stage of identifying deficiencies (pre–Milestone 0), government and industry work together on all five of the following activities. After Milestone 0, industry is capable of some independent work on the last four activities:

- Intelligence collection and analysis
- Threat susceptibility and accessibility analyses
- Functional requirements analysis and synthesis
- Threat model and simulation development

5.2.3 Create an Integrated Acquisition Team

To encourage early and continuous partnering of all functional areas, each acquisition is supported by an Integrated Acquisition Team (IAT). This team comes together when a deficiency is first identified and works together until a solution to the deficiency is developed. The IAT is called the Integrated Concept Team (ICT) during mission needs determination and concept exploration, when the warfighter leads the effort. The IAT is called the Integrated Product Team (IPT) after the program office is formed and the program manager takes over.

Currently, the system program office (SPO) isn't formed until Milestone I. To provide leadership from the time a deficiency is identified until Milestone I, the ICT guides decision making and concept exploration. Since ICT members are involved in discovering the problem, the ICT shares a common focus—solving the deficiency.

Functions of the IAT

Having an IAT ensures that the various acquisition issues, including technical, budgetary, operational, and program issues, are managed throughout the entire process. In addition, the IAT:

- Follows the acquisition at both the high level and the detail level.
- Develops a partnering relationship among all the represented agencies and builds trust between the agencies.

- Starts the interdisciplinary thinking process earlier and reduces the chance of missing important issues.
- Increases decision makers' confidence in the process.

Composition of the IAT

The ICT is led by the warfighter.

An IAT should include experts from the following areas:

- MAJCOM requirements staffs
- Program management expertise
  - EW Integration Office (EWIO) if no SPO exists
  - System Program Office (SPO) if the SPO exists
- Test and evaluation agencies
- Support contractors
- Laboratories
- Scientific and Technical Intelligence Center
- Air Warfare Center
- Logistics Support Agency
- Product Group Manager and Development System Manager

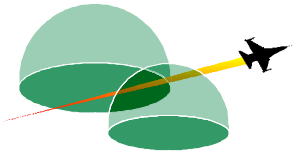
The IAT is led by the team member appropriate to the phase. The lead agency changes as the program matures. Before Milestone I, the MAJCOM requirements staff is the lead agency. After Milestone I, Air Force Material Command might take over leadership of the team. The warfighter leads the ICT, while the program manager leads the IPT.

Industry Involvement in the IAT

Because the IAT has access to data that will become competition-sensitive (for example, concept exploration results from individual contractors), initial involvement in the IAT is limited to contractors who will not compete for product development and production in subsequent phases. The MAJCOM/DR (Director of Requirements) staff, with advice from the SPO, decides which industry representatives are initially involved on the IAT.

In competitive situations, all interested industry representatives should have a fair opportunity to participate.

5.2.4 Perform Geometrically Based Mission Effectiveness/Mission Assessment



With the Military Worth Method developed by the Partnership Process, we now have a way to quantify the EW contribution to the warfighter's mission level and campaign level objectives. The Military Worth Method allows us to connect the geometric benefits of EW systems to our ability to put more targets at risk.

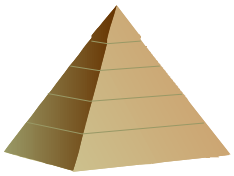
In the past, the value of an EW system was perceived as increased survivability only, and it was difficult to link this measure to mission success. In addition, the idea of increased survivability prevented trades when developing new systems because the warfighter always considered more survivability to be better.

From the decision maker's point of view, there was no way to decide how much capability was enough.

For more information on understanding warfighter needs geometrically, refer to Section 4.3.

Today, with the ability to quantify the military worth of EW systems, we can see how EW systems compare with non-EW solutions in terms of putting more targets at risk. Furthermore, the use of geometrically based assessments helps us follow the direction to use Statements of Objectives instead of Statements of Work and to remove specifications from Operational Requirements Documents and Systems Requirements Documents. The Military Worth Method supports these directions by providing a measure that is suitable for high-level documents.

5.2.5 Introduce the Military Worth Method Into Acquisitions



The Military Worth Method allows us to identify problems and determine how seriously they prevent us from achieving mission and campaign objectives. The problems are also stated in terms meaningful to the warfighter. In this way, the warfighter can determine which problems are important enough to commit time and money to solving.

Further, by using warfighters to determine how an OPLAN will be accomplished, we provide the foundation for analyzing mission requirements and determining the military worth of possible solutions. Military worth quantifies the value of possible solutions to the government.

For more information on the military worth framework for acquisitions, see Section 4.2.

In the past, problems were often stated in terms of solutions. For example, the ORD for the EF-111 system improvement program called for specific improvements in transmitters and computers. It's tempting to leap straight to a solution before we completely understand the problem. But by taking the time to analyze the problem comprehensively, we can usually achieve innovative and superior solutions.

Today, we can quantify problems in terms of our projected capability pitted against the enemy's capability. We can identify which tasks we can accomplish and which tasks we can't accomplish.

By using the Military Worth Method, we can focus on finding solutions to actual problems, not perceived problems. Also, because the problem is stated in a way that doesn't suggest a specific answer, industry is free to propose a range of creative solutions.

5.2.6 Use Standard Threat Scenarios

The Air Force recognizes the need for standard threat scenarios. Threat scenarios are developed and approved by the Defense Intelligence Agency (DIA). A threat scenario contains information such as:

- Enemy order of battle
- Threat laydowns
- Disposition of enemy troops
- Types of enemy weapons
- Enemy intent

In the past, many programs used different DIA-approved threat scenarios to demonstrate the worth of their systems. In the future, we will use standard DIA-approved threat scenarios that are based on the Defense Planning Guidance (DPG) prepared by the National Command Authorities. These scenarios will serve as the threat basis against which all requirements must be developed.

By always using standard threat scenarios, we can make "apples-to-apples" comparisons between EW programs. This ensures that threat scenarios are not biased to support one program over another. We can also compare the contribution of EW systems to the contribution of other solutions within the same scenario context.

All standard threat scenarios will be available from a single agency. Ideally, these scenarios will become standard among the military services, not just within the electronic warfare community.

5.2.7 Create a Consolidated Library of Information on Threat Systems

A consolidated threat library makes all detailed threat information available through a single gateway. The library includes information on both threat characteristics and threat vulnerabilities.

In the past, the SPO received only a System Threat Assessment Report (STAR). The STAR basically listed the enemy systems that posed a threat to our platforms or people, along with a few of the threats' characteristics. In effect, the STAR showed what a threat looked like from the outside.

In the future, the threat library will contain all the government's detailed information about each listed threat. This information includes what is typically compiled in the EW Integrated Reprogramming (EWIR) database. Industry will then have ready access to each threat's specific vulnerabilities so they can come up with means to defeat it.

The threat library is a mechanism to disseminate threat information to industry in one package. The benefits of the consolidated threat library are that it allows government and industry to use the same set of data and allows authorized users to access the data more easily. This does not mean that security will be compromised.

Contents of the Threat Library

For each threat, the threat library contains the following information:

- State of the intelligence
- Operation and design of the threat
- Known vulnerabilities and susceptibilities
- Technical characteristics of countermeasures that can exploit the vulnerabilites (that is, electronic protect [EP] techniques database)
- Operational effectiveness achievable by various countermeasures and their necessary technical characteristics

Developing the Information in the Threat Library

The following activities should be conducted to develop the information in the threat library:

- Threat analyses

- Threat vulnerability analyses (susceptibility and accessibility) and experiments
- EP functional requirements analyses and experiments
- EP synthesis
- National level conferences and workshops

Understanding the Current Threat Environment

It's important that the R&D community (service labs, DoD agencies, and contractors) understand the threat environment and the warfighter's current problems. Thus, the threat library must be accurate and current. The R&D community is often aware of a new enemy air defense system long before it's deployed in substantial numbers. For this reason, the Partnership encourages the following activities:

- Scientific and Technical Intelligence (S&TI) Centers aggressively define threats in the earliest possible stages of their development.
- DoD and service R&D centers aggressively update their knowledge of threat developments and current operational problems.
- We develop a defined response to new threat developments. This response will be achieved through the deficiency analysis described in this chapter.

Generic Composite Scenario

The intelligence community is currently developing a generic scenario for modeling and simulation purposes that represents about 90% of the world's terrain, weather, and threat laydowns. By using the Generic Composite Scenario (GSC), the EWCEA could comprehensively determine mission deficiencies and evaluate solution performance while avoiding the criticism that scenario uniqueness makes comparisons impossible.

Understanding Threat Vulnerabilities and Accessibilities

Figure 5-2 represents all known components of threat systems. Each component is a potential vulnerability. By using this graphic, we can gain insight into threat systems.

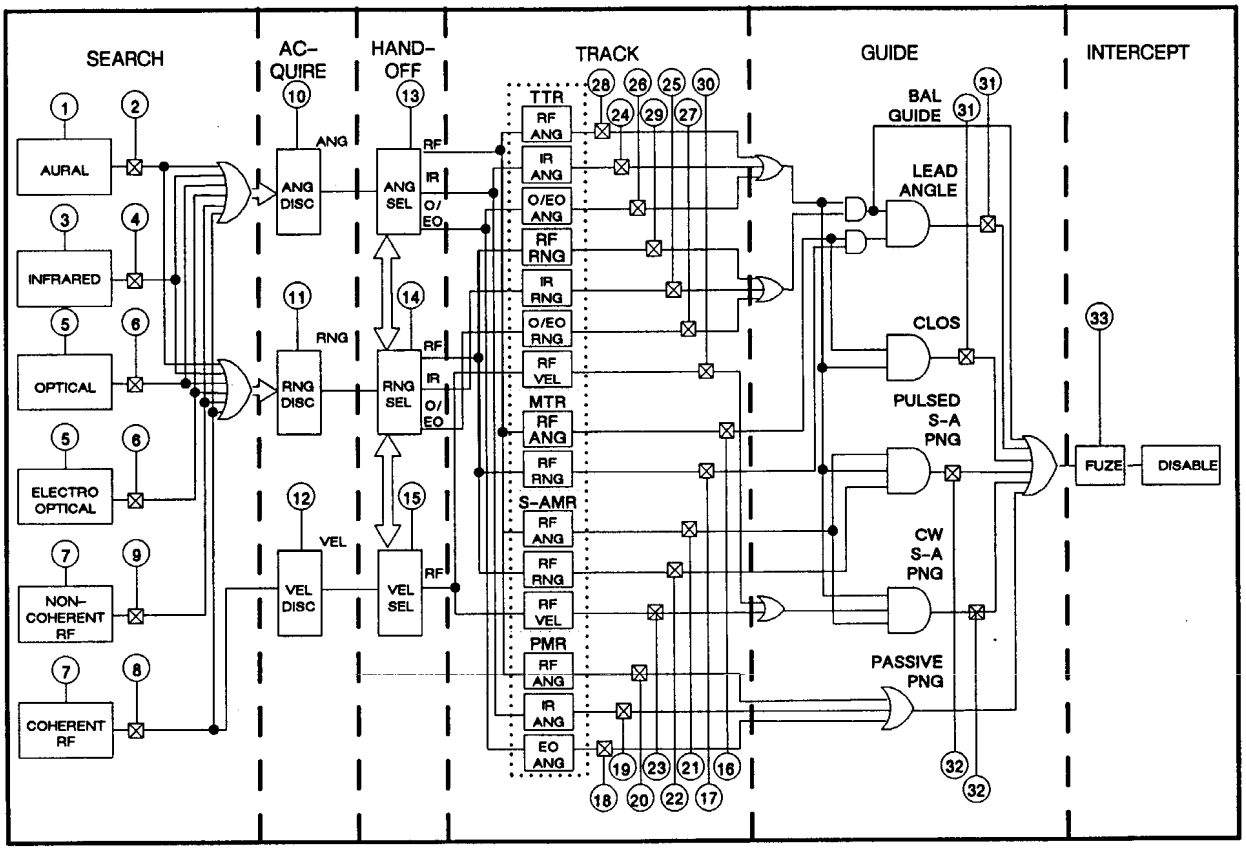


Figure 5-2. Threat Vulnerabilities and Accessibilities. *This graphic shows individual threat potential functional vulnerabilities for a general threat weapon system.*

5.2.8 Accredit the Requirements Development Field

Requirements development is as much a part of acquisition as research, systems engineering, program management, contracting, and testing and evaluation. However, the personnel assigned to MAJCOM requirements staffs have often lacked the expertise, training, and career support necessary to be experts in the field of military requirements development.

Create Position Descriptions and Requirements Training

Just as the military has recognized the importance of training and area expertise identification in the field of acquisition, we suggest developing similar ways to accredit the field of requirements development by taking the following steps:

- Create position descriptions to indicate the required levels of experience, training, and requirements development expertise.

- Extend the Acquisition Professional Development Program (APDP) to include the requirements development field. The Defense Acquisition University (DAU) should also create requirements-related courses within a comprehensive curriculum.
- Send requirements development officers to training classes before they take their first acquisition position. With formal training in these areas, we will have a group of people who understand how to develop requirements to produce optimum results.

One benefit of this accreditation is that requirements training will be available for other members of the acquisition community. For example, if testers are trained in the requirements process, they can better ensure that the requirements are met. This example also applies to program managers, researchers, and systems engineers.

Increase the Ratio of Acquirers to Operators on MAJCOM Requirements Staffs

Refer to the brief "EW Acquisition Reform—A Contractor's Perspective" by Peter B. Pappas, 16 August 1995.

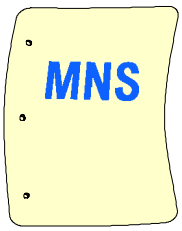
The requirements development community is as important to the acquisition process as program management, industry, and testing. This is because decisions made early in the acquisition process have a tremendous effect on later stages. Approximately 70% of a system's life cycle cost is effectively defined by the time a Milestone I decision is made. For these reasons, MAJCOM requirements staffs should include a greater proportion of people with an acquisition background.

There has already been direction from the Air Force Personnel Center to reduce the number of rated personnel on headquarter staffs (such as HQ ACC and HQ AMC). This gives us an opportunity to fill these positions with people who possess acquisition backgrounds. HQ staffs could even include civilians, who are transferred less often, to help provide a measure of corporate memory.

While this redesign idea recommends that we increase the ratio of acquisition personnel to operators, it does not specify an optimum ratio. The next steps are to determine the optimum ratio and take advantage of the natural turnover rate to approach the optimum ratio as soon as possible.

Finally, as we implement this redesign idea, we need to change the environment of MAJCOM staffs. We must make such assignments attractive to acquisition personnel by creating an atmosphere that values the expertise they bring.

5.2.9 Apply Funds for Concept Exploration on Approval of the MNS



The Partnership Process recognizes that thoroughly analyzing mission needs at the beginning of an acquisition is critical to identifying the real requirements and finding an appropriate solution.

In the past, this analysis has often been skipped because we thought we knew what the solution was. We thought we could save time and money by fast-forwarding past the problem and going directly to the answer. Another reason that this analysis has been avoided is that there was no institutionalized process to provide the required funding.

See Chapter 1, The Case for Change.

The record speaks for itself.

In the future, we recommend that for a MNS to secure formal approval, funds must first be budgeted for the subsequent stage of establishing requirements. If there isn't a serious commitment to follow up the MNS with the necessary analysis, the MNS should not be formally approved. Instead, it should be held in "conditional" status, ready for immediate approval if funds are applied to the MNS for continued analysis.

The benefits of applying funds to creating the MNS are:

- The acquisition community will have guidance on what solutions the warfighter is serious about pursuing.
- Development programs will proceed on a firm analytical foundation.
- All potential solutions will have a better chance of being considered.

By putting more time and money into the planning stages of an acquisition, we ensure that we have fewer false starts and dead ends. It takes time to save time (and money). Frontloading pays for itself by reducing the cost and timeline of the activities that are prone to overruns and slips in schedule.

5.3 The Step-by-Step Process

The main output of the steps in this chapter is a Mission Needs Statement (MNS). The MNS is a short document summarizing the results of a force-on-force analysis that considers our projected capability versus a projected enemy capability. The MNS gives the

results of this analysis in terms of deficiencies—it gives a summary of the tasks we weren't able to accomplish.

In the past, the MNS was created in response to a new threat. The warfighter said, in effect, "There's a new threat out there and I need capability against it." The MNS might have included some characteristics of the threat and a proposed solution. However, the MNS didn't quantify the severity of the threat or specify how much better the warfighter needed to perform against the threat in order to defeat it.

Today, the Military Worth Method allows us to more accurately define warfighter needs. Deficiencies are no longer stated at an engagement (threat) level, but are stated at a campaign level. By stating the deficiency at a higher level, we leave room for a wide range of solutions. Furthermore, the deficiency is stated in terms that have value to the warfighter.

One purpose of this process is to move away from creating "point deficiencies"—specific problems, such as "Current jamming capacity is deficient by 12 dB," that do not have a clear link to campaign objectives. Instead, we can now create an entire trade space that shows how different levels of deficiency relate to varying abilities to achieve our objectives—for example, putting targets at risk. This ability to put targets at risk can be translated into campaign objectives; it connects directly to the needs of the warfighter.

MNS Provides a Vehicle for Industry

For more information about distributing the MNS to industry, see Section 6.3.2.

In addition, the MNS provides a vehicle for industry to follow the thought process we use to determine the deficiency. In a sense, the MNS and its supporting data allow us to put the entire problem into one package. Industry participates in this activity by:

- Attending warfighter-hosted "industry days"
- Becoming members of the IAT when appropriate
- Observing the translation of warfighter war plans and CONOPS into actionable ATOs and mission plans
- Gaining access to the source data and analytical tools used to quantify mission deficiencies
- Gaining access to the resulting MNS

The following sections explain how we quantify the mission deficiencies and include them in the MNS. The main steps are:

- Obtain threat scenarios for modeling.
- Model the missions and analyze the data.
- Include appropriate information in the MNS.

5.3.1 Obtain Threat Scenarios for Modeling

The Role of the MAJCOMs

The agencies primarily responsible for identifying mission deficiencies are the MAJCOMs. In general, the MAJCOMs articulate the warfighter's needs and represent the warfighter throughout the phases of an acquisition.

Specifically, in the Partnership Process, the roles of the MAJCOMs are to:

- Lead the mission area team.
- Task EWCEA to perform the analyses that support the process of establishing requirements, including Mission Area Analysis, deficiencies quantification, and Analysis of Alternatives (AoA).
- Lead the effort to involve the actual warfighter in developing warfighting plans, including OPLANs, ATOs, and mission plans, that are used for modeling and simulation.
- Prepare and approve the MNS and ORD.
- Lead the Integrated Concept Team (ICT).

In general, the MAJCOMs articulate the warfighter's needs and represent the warfighter throughout the phases of an acquisition.

- Task EWCEA to organize and manage the concept exploration effort.
- Participate on the Integrated Product Team (IPT) and throughout the rest of the acquisition cycle.
- Lead the Technology Planning Integrated Process Team (TPIPT).

The Role of EWCEA

The agency primarily responsible for *quantifying* mission deficiencies is the EW Center of Excellence for Analysis (EWCEA). This study house will be the center of excellence for providing analytical expertise to assist the MAJCOMs as they identify mission deficiencies. When a MAJCOM identifies a scenario that might have shortfalls in capability, EWCEA gathers the data necessary for modeling and simulation and then performs the analyses to characterize and quantify any deficiencies.

The following sections provide both a step-by-step explanation of EWCEA's role in quantifying deficiencies and an example scenario that is carried through all three sections:

For more information about EWCEA, see Section 6.2.1.

- This section, 5.3.1, explains how EWCEA obtains approved threat scenarios from the DIA, requests OPLANs from the Commander in Chief, requests ATOs from the Joint Forces Air Component Commander (JFACC) staff, and obtains mission plans from operational mission planners.
- Section 5.3.2 explains how EWCEA arranges for missions to be modeled using a standard modeling and simulation toolset and then analyzes the results to identify and quantify the deficiencies.
- Section 5.3.3 explains how EWCEA consolidates the analysis results into a package that MAJCOMs can put into the MNS.

The Role of Test and Evaluation

Representatives from the test and evaluation (T&E) community participate in mission deficiency quantification and in requirements definition so they can plan effective evaluations of a system's capability. In particular, test and evaluation needs to prepare appropriate modeling support to provide appropriate surrogates for the scenarios the warfighter is planning. This is accomplished by having the warfighter provide input into the way that tests are planned.

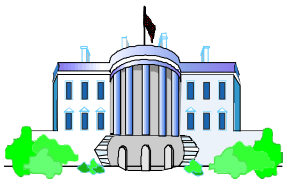
The test and evaluation community now has the ability to digitally model test ranges in a way that captures some of the detail of actual battle scenarios. When the warfighter has planned missions against threats in a particular scenario, the test and evaluation community projects a range set up and creates a corresponding digital model of that set up, based on how they would test that system on the range.

This test scenario includes a smaller number of targets than are planned in actual missions, and this difference, along with other differences between the mission scenario and the test scenario, must be correlated.

Then, they ask the warfighter to plan missions against that model, using the same thought processes that were used to plan the original missions. The end result is a test scenario that serves as a surrogate for the real-world scenario. The objective is to obtain test and model results that provide confidence in the information developed from analysis of the real-world scenarios.

The output of this process is P_k grids for test range flights that reflect test conditions as well as permit accurate comparisons with the P_k grids from the real-world scenario. This process helps to ensure the highest possible correspondence between the warfighter's approach to planning missions and the test and evaluation methods we use to assess the capabilities of the system.

Responding to Defense Planning Guidance



One tenet of the Partnership Process is that the voice of the warfighter must be heard throughout the acquisition process. The warfighter's objectives are driven by Defense Planning Guidance (DPG) from the National Command Authorities. For this reason, the process of identifying deficiencies begins with an assessment of how well the military can meet this guidance.

Defense Planning Guidance directs how the military will support national security objectives. For example, the DPG says we must be able to support two major regional contingencies. More specifically, this guidance could suggest that we might need to fight a war in southwest Asia within the next 15 years.

In response to Defense Planning Guidance, the DIA creates threat scenarios that represent their best estimate of what these future conflicts will look like. A threat scenario typically includes the following information:

- Laydown of the threats
- Characteristics of the threats

- Intended movement of the enemy troops
- Enemy concept of operations (CONOPS)

Figure 5-3 illustrates how the DPG gives direction on possible future conflicts.

Figure 5-3. Defense Planning Guidance. *Defense Planning Guidance gives direction on possible future conflicts.*

Performing Mission Area Analysis

The Mission Area Analysis is a process designed to enhance Air Force warfighting capabilities.

The Mission Area Analysis (MAA) is a process designed to enhance Air Force warfighting capabilities by identifying military objectives in the Defense Planning Guidance, the Air Force Plan, and regional Operations Orders and Operations Plans. The MAA uses a strategy-to-task methodology.

The user commands regularly review the DIA's future threat scenarios in their annual Mission Needs Assessments (MNAs). The user performs a qualitative top-level analysis of the scenarios to see if there are deficiencies.

When a user finds a scenario that appears to have deficiencies with potential implications for EW solutions, the user tasks EWCEA to perform the analysis to quantify the need and determine the military worth of potential EW solutions to the campaign. EWCEA might perform the analysis in-house or might contract it to another organization. The user might also request an analysis for a current threat scenario if a conflict appears imminent.

Example:
Mission Area Analysis

For example, Air Combat Command (ACC) might suspect that there are deficiencies in a scenario in southwest Asia in the year 2010 and might contact EWCEA to characterize and quantify any deficiencies that may exist.

Obtaining Approved Threat Scenarios

Based on the user's request, EWCEA obtains an approved threat scenario from DIA. It's important that an approved threat scenario, with only DIA's predicted threats, is used for the analysis. Additional threats should not be incorporated into the standard scenario merely to justify EW programs.

Note that EWCEA and other agencies are free to communicate with DIA to refine the standard scenarios, when appropriate.

Example:
Threat Scenario

For example, ACC wants to identify deficiencies in a DIA-approved scenario in southwest Asia in 2010. In this scenario, a Middle East country invades a neighboring country. Part of the guidance from DPG is to ensure stability in the region and free access to trade.

In this scenario, the red (enemy) forces include a critical command and control complex. The command and control complex is defended by a wide array of strategic and theater threat systems. The specific threats in this scenario are:

- Surface-to-air missile X
- Surface-to-air missile Y
- Anti-aircraft artillery A
- Anti-aircraft artillery B

Figure 5-4 illustrates the kind of information found in a typical threat scenario.

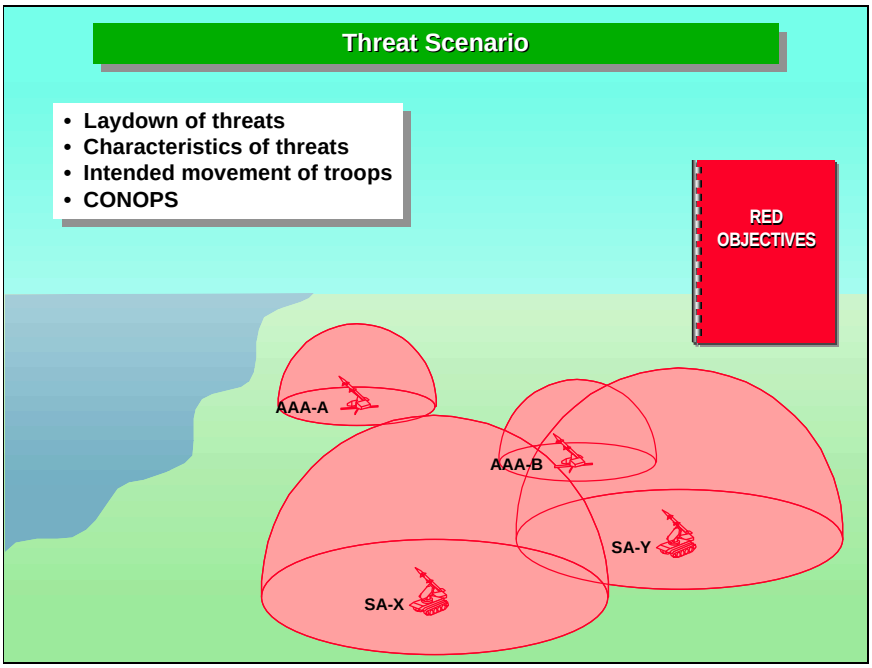


Figure 5-4. Threat Scenario. *Threat scenarios list the laydown and characteristics of threats for the red (enemy) forces.*

Requesting the OPLAN and Managed Attrition Rate

The OPLAN describes the actions the warfighter takes to accomplish the Defense Planning Guidance.

Once EWCEA has an appropriate threat scenario from DIA, we can obtain the blue (Air Force) strategy-to-task to defeat the red forces, beginning with the OPLAN and continuing to ATOs and mission plans.

EWCEA requests an OPLAN from the scenario's Commander in Chief (CINC). The CINC chooses an OPLAN with theater objectives selected by the CINC to meet the objectives of the Defense Planning Guidance. EWCEA also requests the CINC's managed attrition rate for this scenario.

The OPLAN describes the actions the warfighter takes to accomplish the DPG. The plan includes target sets and the data necessary to understand the target sets. In addition, the OPLAN details what the warfighter is expected to accomplish on each day of the campaign—how far the enemy troops have advanced or retreated and the capability of the enemy's defenses.

Specifically, the OPLAN includes:

- Order of battle
- Necessary assets (battalions, squadrons, bases, etc.)
- Basing modes
- Sequence timing

Though the OPLAN contains information for the entire campaign, EWCEA does not analyze every day of the campaign. Instead, EWCEA models only certain key days of the campaign. EWCEA chooses key days that represent different intensities of the threats, from full-up to mitigated. (The day-by-day movement of troops in the OPLAN is modeled in a campaign-level model such as THUNDER.)

Note that modeling every day of the campaign may not be necessary, and may even degrade the quality of the model if plans aren't directly linked to warfighter guidance. By sampling key days, we keep the warfighter involved and gain insight about the phases of the campaign that are important to the warfighter.

***Example:** OPLAN*

In our example, EWCEA decides that the key phases of the Southwest Asia (SWA) 2010 scenario occur at days 1, 9, and 25. The OPLAN contains the CINC's theater objectives for these days of the campaign.

Sampling key days in a campaign is how the Military Worth Method is currently applied. See Sections 4.1.2 and 4.8.3 for a discussion on the issues associated with the variable of "time required."

Day	Theater Objective	State of Enemy IADS
Day 1	Stop invasion	100%
Day 9	Begin counteroffensive	80%
Day 25	Destroy war-making potential	20%

Figure 5-5. OPLAN Information. *This table shows the kind of information found in the OPLAN, including the theater objectives and the state of the enemy's integrated air defense system (IADS).*

In addition, the SWA 2010 scenario includes the F-19 strike aircraft, which has recently been fielded and is projected to still be in inventory in 2010. In this example, ACC is interested in determining the effectiveness of the F-19 in this particular scenario.

Figure 5-6 illustrates the kind of information found in a typical OPLAN.

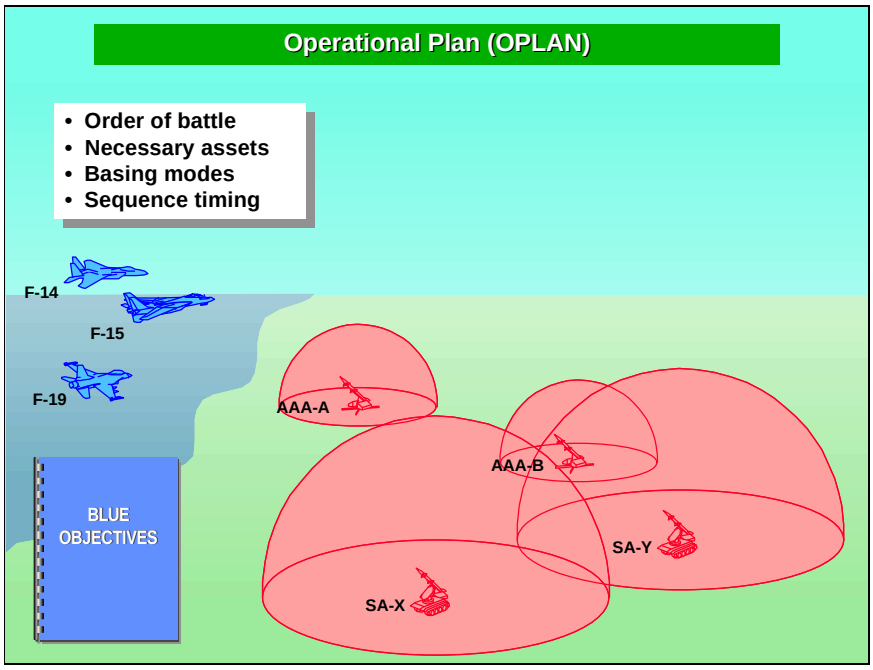


Figure 5-6. OPLAN. *The OPLAN lists the order of battle and necessary assets for the blue (Air Force) forces.*

Requesting Air Tasking Orders

EWCEA requests ATOs for the key days of the campaign.

Next, EWCEA requests corresponding ATOs from the JFACC staff for the key days of the campaign specified by the CINC. The ATOs should include details such as:

- Force packaging
- Targets and times
- Weapons loads
- Tasks per mission
- Mission success criteria

EWCEA includes projected weapons based on the warfighter's current levels of force structure investment, current Mission Area Plans (MAPs), and current strategic thinking. EWCEA may need to arrange for the JFACC staff to be instructed on the characteristics of these projected weapons.

The benefit of including projected weapons in the analysis is that the future warfighter receives valuable training and preparation. The warfighter can begin to change OPLANs for future scenarios based on our projected capabilities at that time. Also, the warfighter can correctly determine what future deficiencies will remain after the systems currently in development are deployed.

***Example:** ATO*

In our example, JFACC provides EWCEA with ATOs for the key days of the SWA 2010 scenario. Figure 5-7 shows the kind of information included in an ATO.

Mission	Target	Mission Criteria	Package	Weapon	TOT
Mission 814	Command and Control Complex	Communication capability eliminated	F-19 × 4	AIM-9X × 2 JSOW × 2	0515Z
			F-22 × 2	AIM-120 × 2 JDAM × 2	0515Z
			F-16 HTS × 3	AIM-120 × 2 AGM-84 × 2	0515Z

***Figure 5-7. ATO Information.** This table shows the kind of information in an ATO, including targets, mission criteria, force packages, weapons, and time over target (TOT).*

Furthermore, in this example EWCEA would arrange for ACC to instruct the JFACC staff on the projected capabilities of the F-19.

Figure 5-8 illustrates the type of information found in a typical ATO.

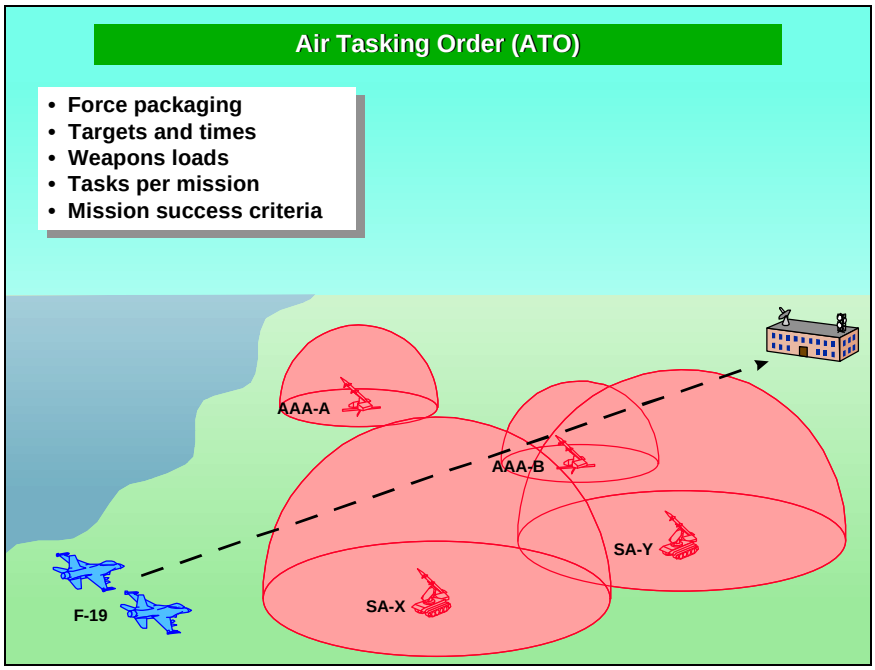


Figure 5-8. ATO. *ATOs list force packaging, targets, times, and other information for a single day of the conflict.*

Obtaining Mission Plans

During this stage of identifying deficiencies, it is critical to have input from the warfighters who would fly the missions **today**.

EWCEA then has mission plans created from the ATOs by the mission planners and operational crews who are operating in that scenario. During this stage of identifying deficiencies, it is critical to have input from the warfighters who would fly the missions *today*—the people at the "tip of the spear."

Warfighter input adds credibility by minimizing potential errors that could be introduced by modeling personnel who lack current operational experience or by automated computer mission planning tools that are run without operator insight. Furthermore, assumptions can be more explicitly documented.

The mission plans should include details such as:

- Times
- Distances
- Headings
- Altitudes
- Weapons loads

- Fuel flows
- EW configuration
- Interplay of force package assets

Example:
Mission Plan

In our example, the mission planners create mission plans to fill the ATOs for days 1, 9, and 25. Figure 5-9 illustrates a sample mission plan.

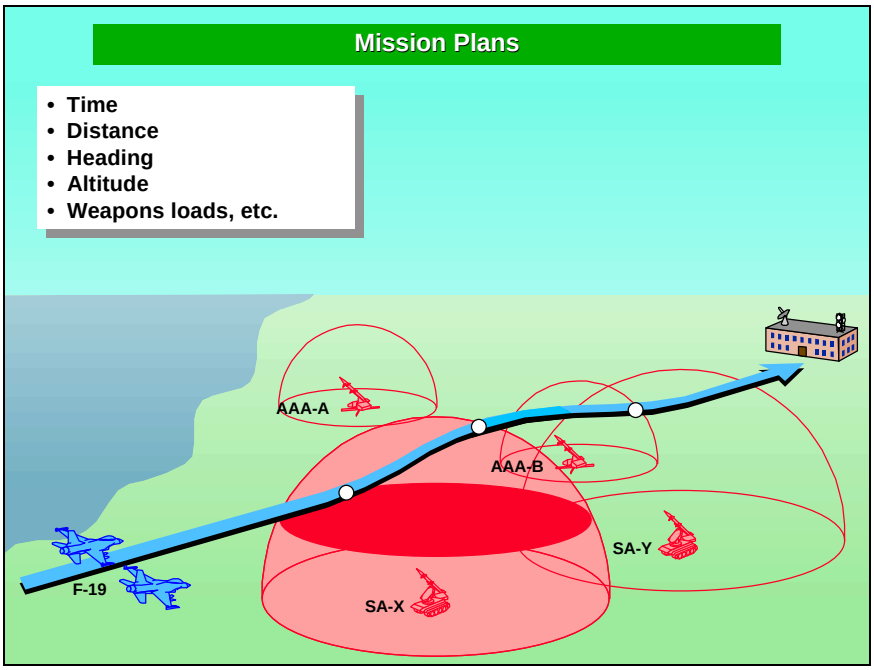


Figure 5-9. Mission Plan. *Mission plans give specific instructions for each mission, such as times, distances, headings, and altitudes.*

When the steps in Section 5.3.1 are completed, EWCEA has the necessary data to model the mission runs in the mission-level model SUPPRESSOR or an equivalent program.

5.3.2 Model Missions and Analyze the Data

Now that computerized modeling tools are available, we can quickly gather realistic data about the effectiveness of possible strategies, tactics, routes, platforms, and EW equipment. This data provides the basis for the deficiencies that will be documented in the MNS.

In Section 5.3.1, we began an example situation in which EWCEA helped a user command identify and quantify deficiencies in a scenario in southwest Asia in 2010. EWCEA obtained an approved

threat scenario from DIA, requested an OPLAN from the CINC, requested ATOs for key days from the JFACC staff, and obtained mission plans from operational mission planners.

By performing these steps, EWCEA completed a simulation of the strategy-to-task for the scenario. Note that the steps in Section 5.3.1 involved simulation, but no modeling. At this point, modeling begins.

For more information about analyzing the data from model mission runs, see Section 4.4.

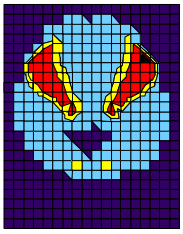
In this section, we continue the example by flying the model mission runs and analyzing the mission data to identify and quantify deficiencies. The analysis for this example follows the same process that was used for the simpler example in Chapter 4. However, because the example used in this chapter is more realistic and complex, only part of the mission data for the example will be shown.

The modeling in this chapter could be performed by existing programs, such as ESAMS, THUNDER, and SUPPRESSOR, or by the object-oriented programs that are currently being developed.

Quantifying the deficiencies in the mission data involves the following steps:

- Generate P_k grids in an engagement model.
- Gather mission data in a mission-level model.
- Analyze the mission data for deficiencies against specific threats.
- Create a mission success table.
- Create an offset reduction trade space table.

Generate P_k Grids in an Engagement Model



Now that EWCEA has obtained the mission plans from the warfighter, we know the altitudes, headings, and air speeds that the warfighter will use for each mission and threat in the threat scenario. The next step is to generate a probability of kill (P_k) grid for each engagement using ESAMS or an equivalent accepted engagement model.

Note that the P_k grid in Figure 5-11 is represented as a solid disk within the SA-X threat "bubble" for simplicity. In reality, P_k grids are not perfectly circular and do not have the same P_k across the entire grid.

Gather Mission Data in a Mission-Level Model

EWCEA combines the "dry" P_k grids and the information from the SWA 2010 scenario in the mission level model SUPPRESSOR or an object-oriented, open architecture modeling tool. Next, EWCEA runs the planned missions to determine which targets can be achieved.

Continuing our example, the theater commanders plan to attack 2,000 targets with the F-19 aircraft on days 1, 9, and 25 of the campaign (see Figure 5-10). The acceptable attrition rate of the F-19 for this campaign is 0.005.

Effectiveness of F-19 Aircraft in SWA 2010 Scenario		
Day of Campaign	**Targets Planned**	**Targets Achieved**
Day 1	400	74
Day 9	650	137
Day 25	950	189
Totals	**2,000**	**400**

Figure 5-10. Effectiveness of F-19 Aircraft in SWA 2010 Scenario. *By running the missions in a modeling program, we find that only 20% of the targets are achievable (400 out of 2,000) with the currently projected capability for the F-19.*

The model runs show that only 20% of the planned targets (400 out of 2,000) can be achieved with the currently projected capability for the F-19. At this point in the analysis, we've determined that the F-19's deficiency in this scenario is 80% (because 80% of the targets can't be reached while maintaining an acceptable loss rate).

Figure 5-11 illustrates a sample unsuccessful mission run.

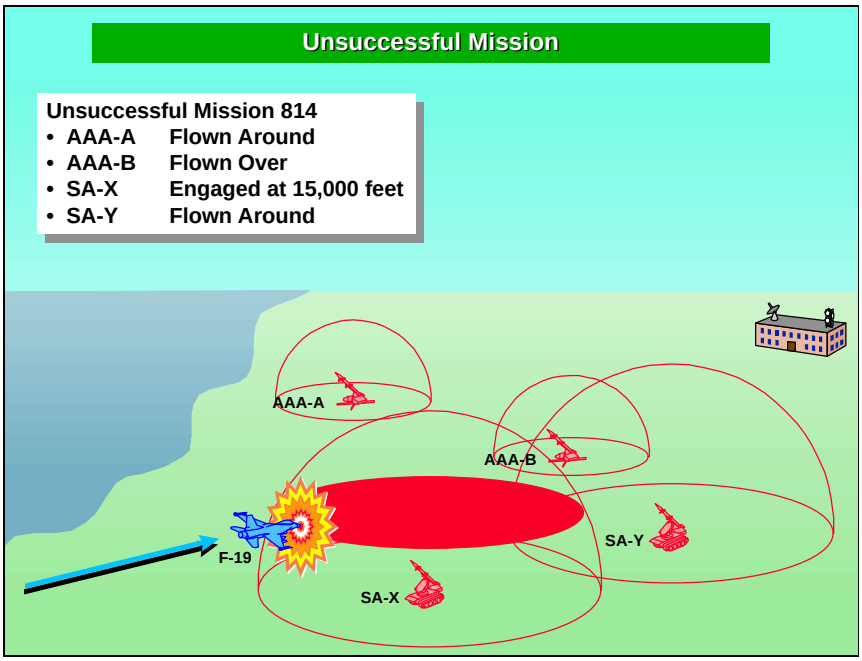


Figure 5-11. Unsuccessful Mission. *This model mission was unsuccessful because of the threat SA-X. Note that the solid disk represents the P_k grid for threat SA-X for the altitude at which the F-19 is flying.*

Analyze the Mission Data for Deficiencies Against Specific Threats

The next step in the analysis is to determine the reasons for the F-19's unsuccessful missions. Recall that there are four types of threats in the scenario:

- Surface-to-air missile X (SA-X)
- Surface-to-air missile Y (SA-Y)
- Anti-aircraft artillery A (AAA-A)
- Anti-aircraft artillery B (AAA-B)

For each of the F-19's 1,600 unsuccessful missions, we determine whether the aircraft was stopped by an SA-X, SA-Y, AAA-A, AAA-B, or some combination of the four. See **Error! Reference source not found.** for a breakdown of the deficiencies by threat.

Threat	Targets at Risk	Goal	Deficiency
SA-X	**20**%	100%	**80**%
SA-Y	**30**%	100%	**70**%
AAA-A	**60**%	100%	**40**%
AAA-B	100%	100%	0%

Figure 5-12. Deficiencies by Threat. *This table shows the effect of each threat in the scenario on our ability to put targets at risk.*

"Targets at risk" is the measure of ATO accomplishment and the EW equivalent of "targets achieved" for a strike mission. A target is at risk if the aircraft can get to its weapon release point and return to base without loss.

Figure 5-12 shows that the F-19 was completely successful against threat AAA-B—it achieved 100% of its targets against these threats. However, threats SA-X, SA-Y, and AAA-A kept it from achieving some targets, as shown by the targets at risk (TAR) percentages less than 100%.

Note that the percentages of targets at risk in the second column do not add up to 100%. This is because each row of the table shows the effect of each threat *by itself*. In other words, if the F-19 had only AAA-A to contend with, it could achieve 60% targets at risk. If the aircraft had only AAA-B to contend with, it could achieve 100% targets at risk.

But since all four threats are present, the bottom line deficiency is the result of the *greatest* threat in the table. In this example, SA-X is that threat. If all the other threats were eliminated, the F-19 still could get to only 20% of its targets. Therefore, the bottom line deficiency for the F-19 in this scenario is 80%.

Create a Mission Success Table

For a detailed discussion of offset reduction, see Section 4.3.3.

The next step in the analysis is to determine what offset reduction per threat would be required to get the F-19 to each target. The term "offset reduction" describes how much closer an EW system allows an aircraft to get to the target while still maintaining an acceptable P_k. This is the stage of the analysis where we can connect the geometric benefits of an EW system to the ability to put more targets at risk.

In Figure 5-13, we analyze each of th eF-19's 1,600 unsuccessful missions. Note that threat AAA-B isn't analyzed because the aircraft has no deficiency against that threat (refer to Figure 5-12).

	Required Offset Reduction (%)		
Missions	**SA-X**	**SA-Y**	**AAA-A**
Mission 1	35	15	80
Mission 2	65	0	20
Mission 3	40	20	75
…	…	…	…
Mission 1,598	10	25	0
Mission 1,599	45	10	55
Mission **1,600**	30	5	25
Total Solution	**75%**	**55%**	**80%**

Figure 5-13. Mission Success Table. *This table shows the offset reduction per threat that would allow each mission to be successful.*

For more information on deriving the mission success table, see Section 4.4.2.

Figure 5-13 shows the offset reduction per threat that would allow the F-19 to get to each target. For example, for the particular flight path flown on mission 1, if we could reduce the offset distance of threat SA-X by 35%, threat SA-Y by 15%, and threat AAA-A by 80%, then the F-19 could reach the target on mission 1.

By analyzing all the mission runs, we can find the "total solution"—the amount of offset reduction per threat that would allow us to get to all the targets on all the missions. This "total solution" is the highest offset reduction number in each column.

Figure 5-12 illustrates the offset reduction required for threat SA-X to make the mission in **Error! Reference source not found.** successful.

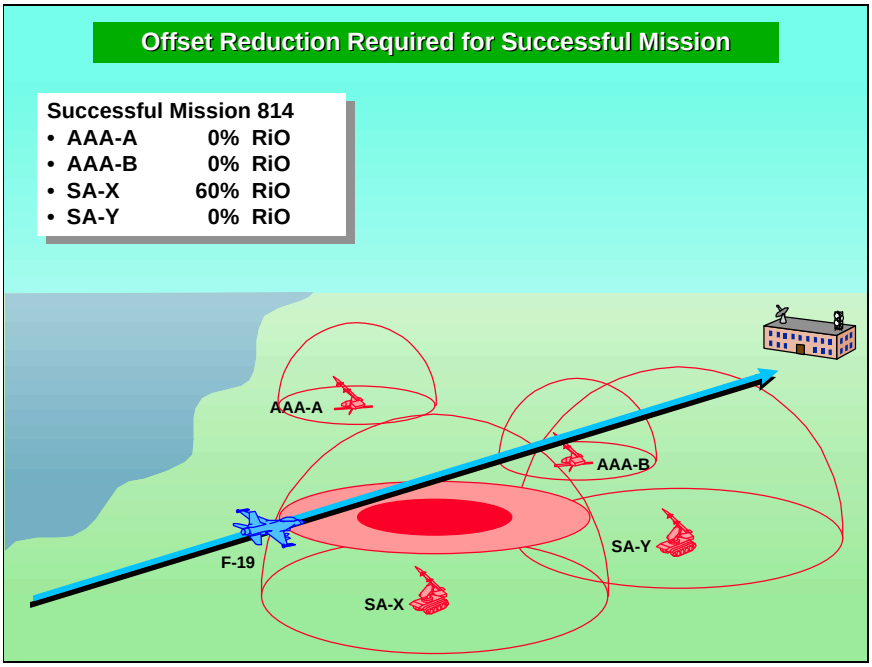


Figure 5-12. Required Offset Reduction. *This graphic illustrates the offset reduction for threat SA-X that would allow the F-19 to get to its target.*

Create an Offset Reduction Trade Space Table

At this point in the analysis, we know the F-19's current capability (20% targets at risk) and the offset reduction per threat that would let it achieve 100% targets at risk (the total solution).

Recall that the ability to put targets at risk is the specific measure of the military worth of an EW system. These two values, the current capability and the total solution, form the floor and ceiling of an offset reduction trade space. Within this trade space, we can see what offset reduction per threat is needed to achieve any level of targets at risk between 20% and 100%. See Figure 5-13 for a comparison of RiO and TAR.

Threat	Reduction in Low-Kill Offset (RiO) Versus Targets at Risk (TAR)											←RiO
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	
SA-X	20	20	30	35	45	55	**70**	85	95	**100**	100	
SA-Y	30	35	35	40	50	60	**75**	95	**100**	100	100	← TAR
AAA-A	60	60	65	65	**70**	80	90	**100**	100	100	100	(%)
All threats	20	25	30	45	50	70	70	85	100	100	100	

Figure 5-13. Offset Reduction Trade Space Table. *This table shows the offset reduction needed to achieve any level of targets at risk from our current capability up to 100%.*

Figure 5-13 shows the offset reduction needed to achieve any level of targets at risk from our current capability up to 100%. For example, a capability of 0% offset reduction against threat AAA-A allows the F-19 to put 60% of the targets at risk (not considering the other threats). In contrast, a capability of 70% offset reduction against threat AAA-A would allow the F-19 to put 100% of the targets at risk (again, not considering the other threats).

For more information on deriving the offset reduction trade space table, see Section 4.4.4.

Note that the floor of the military worth trade space—20%, 30%, and 60% targets at risk—is the same percentages of targets at risk as in **Error! Reference source not found.**, which showed the F-19's current deficiencies. In other words, the floor of the offset reduction trade space is the number of targets at risk the F-19 can achieve with its current offset reduction capability.

With this table, we can determine the offset reduction needed to achieve any level of targets at risk:

- For example, if the requirement for targets at risk is set at 100%, then the offset reduction required for threats SA-X, SA-Y, and AAA-A is 90%, 80%, and 70%, respectively.
- If the requirement is reduced to 70% targets at risk, then the respective offset reductions become 60%, 60%, and 40%.

In addition to showing the RiO versus TAR for each threat individually, the table shows how an offset reduction of a certain percentage for all threats would affect targets at risk. For example, an offset reduction of 30% against all threats would allow the F-19 to put 45% of the targets at risk. Note that the values in the "All threats" row aren't derived from the data in the offset reduction trade space table, but are derived from data calculated earlier in the analysis, such as the data presented in Figure 4-20, Table of All Solutions.

Deriving Military Worth from Specific Scenarios

While a system's calculated military worth is scenario-dependent, the system's calculated offset reduction versus specific threats is not.

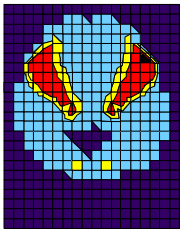
Because the military worth of each possible solution is being evaluated in terms of a specific scenario, the calculated military worth of the solution will be scenario-dependent. In other words, a system that achieves 100% targets at risk in a scenario for Iraq might not achieve 100% targets at risk in a scenario for Korea.

While a system's calculated military worth is scenario-dependent, the system's calculated offset reduction versus specific threats is not. For example, if a system attains a 50% offset reduction versus threat X in an Iraq scenario, then it will attain a 50% offset reduction versus threat X in *any* scenario.

See Section 5.2.7 for a discussion of the generic composite scenario.

Regardless of what scenario is being modeled, the warfighter will be able to see the system's offset reduction versus specific threats. The offset reduction data can then be used in other scenarios to determine the system's military worth in other situations. Furthermore, we are using real scenarios that the warfighter could be called upon to fight—scenarios developed by DIA that were developed in response to the Defense Planning Guidance.

Using Notional and Estimated P_k Grids



Note that the military worth data in the offset reduction trade space table (Figure 5-13) are calculated from notional P_k grids. By *notional*, we mean estimated from reduction in low-kill offset (RiO), not derived from actual solution data. The military worth values in this table should be regarded as best estimates at this point.

As discussed later in Chapter 8, when a contractor gives the government its proposed solution, it will provide the government with the P_k grids for its solution as well. These P_k grids differ from government's in that the contractor's P_k grids represent its best estimate of the solution's behavior. The contractor must combine solution characteristics with 1-v-1 engagement simulations to derive these estimated, not notional, P_k grids. Therefore, the data in the offset reduction trade space table may change slightly when the government incorporates a contractor's data.

5.3.3 Include Appropriate Information in the MNS

Stating the Deficiency

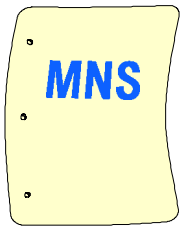
In the MNS, the deficiency is stated at the campaign level, not the engagement (threat) level. For example, the deficiency could be

stated as "In an SWA 2010 scenario, the F-19 achieves only 20% targets at risk."

In the MNS, the deficiency is stated in a way that does not constrain the solutions base.

The deficiency is stated in a way that does not constrain the solutions base. Several solutions that address the deficiency could be proposed. In addition, the deficiency is stated in terms that have value to the warfighter; that is, the deficiency relates to campaign objectives.

Referencing Source Materials



The MNS references the source materials from which its conclusions are drawn, such as:

- Specific software versions of modeling programs
- Specific OPLANs, ATOs, and sets of mission plans
- Threat data and threat scenarios
- Any assumptions in or constraints on the analysis

The purpose of including all source materials is to create an audit trail that industry can use to recreate the government's analysis.

Finally, the government updates the Mission Area Plan (MAP) based on the deficiencies that were identified and the current investment strategy to address them.

Summary

This chapter discussed creating a Mission Needs Statement (MNS), which quantified the warfighter's deficiency. In Chapter 6, we will use the MNS to create the Operational Requirements Document (ORD), which quantifies the requirement. Chapter 6 shows how to advance from the MNS to the ORD within the Partnership's military worth framework.